Module Descriptions

Module designation	**Biochemistry**
Semester(s) in which the module is taught	4th Semester/ Second Year
Person responsible for the module	Prof. Dr. Rudiana Agustini, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, 3 workhours per week (3 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	3 Credit Units (CU) = 4.77 ECTS
Required and recommended prerequisites for joining the module	Mono-function Organic Compound
Module objectives/intended learning outcomes	1. Able to develop logical, critical, systematic and creative thinking in carrying out specific work in his/her field of expertise and in accordance with the work competency standards in the relevant field. 2. Able to interpret and solve problems in the field of biochemistry related to theoretical concepts of structure, dynamics, and energy 3. Able to manage a laboratory and use its equipment by applying K3 principles and skilled in carrying out quantitative analysis, especially determining glucose and protein levels and isolating amino acids.

Content	1. Characteristics of living matter, cellular structure, molecular organization, and energy use in biological systems. 2. Structure, properties, classification, reactions, and functions of amino acids and peptide formation. 3. Protein homology and structural organization from primary to tertiary levels, including conformational characteristics. 4. Structure, properties, functions, classification, kinetics, and mechanisms of enzyme action. 5. Classification of carbohydrates, structural features, mutarotation, and biological functions. 6. Structural and functional roles of mono-, di-, and polysaccharides in biological systems. 7. Structure and function of lipids, membrane components, and membrane organization. 8. Scientific writing related to biochemistry content. 9. Components and structures of nucleotides, DNA, and RNA, and their roles in genetic information flow. 10. Integration of nucleic acid structure and function with gene expression mechanisms. 11. CO_2 and N_2 cycles, heterotroph–autotroph relationships, catabolism–anabolism, and biological energy carriers. 12. Overview of carbohydrate, amino acid, and lipid metabolism. 13. Principles of biochemistry laboratory work, chromatography, glucose analysis, and UV–Vis data interpretation. 14. Factors influencing enzyme activity and analytical principles of protein quantification. 15. Chromatographic identification and analysis of amino acids.
Examination forms	Essay and Oral Presentation
Study and examination requirements	**Study and Examination Requirements/Assessment:** Individual assignments (case analysis reports) Group case studies and discussions Laboratory identification tasks Documentation and presentation of case study findings Laboratory works **Assessment Recap (Case Study-Oriented):** Participatory Activities/Case Study Analysis: 60% PracticalAssessment: 25% Test: 15%% Total: 100%
Reading list	1. emy M. Berg, John L. Tymoczko, Gregory J. Gatto Jr. Lubert Stryer, 2018, Biochemistry, New York, W. H. Freeman 2. Nelson, L.D., Cox, M.M. 2021. Lehninger Principle of Biochemistry 8th Edition, Mac Millan Learning University of Wiconsin 3. Color Atlas of Biochemistry, 2005, Koolman, J and Roehm K.H., 2nd edition, Stutgard New York